Upcoming Technology, Facilities, and Science at mm-Wavelengths

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The recent advent of hundred, and soon thousand, pixel focal plane detector arrays combined with a new investment in large field-of-view ground-based telescopes has revitalized millimeter and sub-millimeter astronomy. Far from being put to rest by the WMAP satellite, the intriguing cosmology still hidden in the anisotropy of the CMB at the scales of clusters and smaller is technologically within our reach and is the target of at least two major telescope construction initiatives. Yet other new telescopes are now planning to study these clusters not as cosmological probes, but in detail as laboratories for the physics of gravitational collapse. At even smaller scales the study of dust-enshrouded high-redshift galaxies (and at larger scales their clustering) will soon enter a new era with planned instruments being capable of detecting several hundreds of sources an hour. Each of these areas of exploration require the high sensitivity of large arrays of detectors along with the large spatial dynamic range afforded by a large single dish telescope. In this talk I review this class of experiments, focusing on the new telescopes, detector arrays, and science soon to be available at mm wavelengths.

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